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Educational Stratification and the Life Course

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SCHOOL EFFORTS?**

Stefanie DeLuca and, James E. Rosenbaum

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INDIVIDUAL AGENCY AND THE LIFE COURSE: DO LOW-SES STUDENTS GET LESS LONG-TERM PAYOFF FOR THEIR SCHOOL EFFORTS?*

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Educational attainment has an important impact on the entire life course. This study adopts the life course emphasis on personal agency to examine the relationship between individual effort and later educational attainment and the possibility that individuals get different payoffs for their personal efforts, depending on their social class. Using the 10-year follow-up of the High School and Beyond (HSB) survey, this study finds that the customary approach to educational attainment is wrong on two counts. First, we find that students' high school efforts have a significant relationship with later educational attainment, even independent of academic achievement. Second, we find that socioeconomic status (SES) affects effort, effort predicts attainment net of SES, and the benefits of effort vary by SES. These results imply that effort matters, but even if low-SES students strive very hard, their outcomes may not be improved as much as those of other students and so they may have less incentive for school effort.

One of the key processes in the life course is educational attainment, which has an important impact on many subsequent life course outcomes. However, while studies of the life course stress the role of personal agency (Buchmann 1989; Heinz 1999), studies of educational attainment often do not. In trying to understand the ways stratification affects educational attainment, we rarely consider the influence of personal agency and the ways stratification affects the payoffs to personal efforts. Indeed, it is ironic that in the United States, where individual effort and self-improvement are extolled, researchers often focus on social-structural or IQ determinants of life course outcomes. We explain this emphasis as a heuristic approach that permits clear hypotheses to be stated. However, journalists, and sometimes even social scientists, forget the simplifying assumptions and slip into an oversimple determinism that possibly underestimates the influence of individual actions and misstates the ways socioeconomic status (SES) affects attainments.

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A large body of sociological research has shown that students from lower socioeconomic backgrounds have lower educational attainments, but the traditional status-attainment model usually ignores the effects of effort (Rosenfeld and Hearn 1982; Sewell 1971; Sewell, Hauser, and Alwin 1975). When analyses find that SES affects educational attainment, there is no discussion of effort, and one cannot tell whether effort is irrelevant, whether low-SES students exert less effort, or whether they get fewer benefits than other students for the same level of effort. While a few recent studies have partially addressed this limitation by examining effort influences on test scores in junior high and early high school, studies do not indicate whether (1) effort has an influence in later high school; (2) high school effort is related to educational attainment later in life; (3) the effects of effort on educational attainment are totally mediated by test scores; and (4) effort has less benefit for some SES groups.

These questions take on special importance because many people doubt that high school effort has any enduring impact. Journalistic articles and trade books argue that IQ and social-class barriers limit the benefits of effort (Herrnstein 1971; Herrnstein and Murray 1994). More important, many youths hold such beliefs. Studies indicate that up to 40 percent of high school students, including many with college plans, believe that effort in high school is not important for their future goals (Rosenbaum 1998, 2001; Steinberg 1997).

There are many reasons for these beliefs. They may partly arise from American cultural values (Steinberg 1997). The American belief in "ability" implies that effort is unimportant. Studies have found that American students believe math achievement is determined by natural ability; if students cannot solve a problem immediately, they quickly give up, explaining that they lack math ability (Resnick 1999; Stevenson and Stigler 1992).

These beliefs may also arise from structural barriers and subcultural norms about these barriers. Willis' (1977) ethnographic research has described the ways working-class youths believe that school effort is ineffective. Fordham and Ogbu (1986) have shown how subcultural norms encourage blacks to believe that they cannot benefit from school effort. Both studies speculate that social class barriers make low-SES youth realize that their efforts will have little payoff (see also Jencks and Phillips 1998; Ludwig and Cook 1998; Mickelson 1990).

Some institutional practices may also encourage these beliefs. In particular, open admissions programs in community colleges admit students, even if they did poorly in high school, including those who just barely passed (with a "D" average). These colleges also offer a variety of remedial courses which give students a second chance at subjects they did not master in high school (Deil and Rosenbaum 2000; Grubb 1996). It is hoped that students who were not motivated by poor high schools will be motivated in college, thus making high school effort and achievement irrelevant to college attainment. These policies have been noticed by students, who may have inferred that high school effort is not important. In a survey of 12 high schools, students report that they do not have to exert effort in high school; they could wait to exert effort when they get to college (Rosenbaum 2001). The next section of this paper examines the previous research on effort, which points to its importance in the process of educational attainment.

BEYOND ABILITY AND SOCIOECONOMIC INFLUENCES

Although Durkheim ([1912] 1964) noted that the engagement of youth was a problematic issue for society, and Willis (1977) and Fordham and Ogbu (1986) have shown that working-class and black youth have difficulty becoming engaged in school effort, the American status attainment model has ignored effort. Indeed, research on educational attainment stresses the influence of socioeconomic background and ability (Kerckhoff 1974; Sewell et al. 1975; Jencks and Phillips 1998). The emphasis on ability is a particularly strange approach for sociologists, because there are reasons to believe that our notions of ability are socially constructed and influenced by social contexts (Rosenbaum 1986). Some status-attainment researchers have questioned the simplifying assumptions involved in this approach and acknowledged that ability test scores “reflect experience as well as innate qualities” (Kerckhoff 1974, p. 3), but this complexity is not incorporated in the analyses or conclusions of most studies.

Indeed, status attainment models that incorporate social psychological factors have not included students’ efforts (Heyns 1978; Sewell 1971; Sewell et al. 1975). This omission conveys an implicit assumption that students from all SES backgrounds try equally hard, but that SES imposes some barrier or initial handicap that frustrates their efforts. Later research has shown that SES effects on educational achievement are greatly diminished when controlling for academic resources such as grades, class rank, test scores, and high school track (Alexander, Holupka, and Pallas 1987). Other work has shown that class rank, aptitude, and curriculum mediate the effects of class, race, and sex on college attendance (Thomas, Alexander, and Eekland 1979). Alexander and Cook (1979) question the relevance of educational plans as motives and therefore determinants of educational attainment. Despite all of these discussions of measured and tracked academic performance, researchers rarely consider the influence of student effort, per se, on later educational attainment.

In an earlier work, Jencks and colleagues (1979) provide a notable exception by including an analysis of the effects of personality and noncognitive traits on occupational status. Using multiple data sets from the 1960s and early 1970s, they found that good study habits increased occupational status but not earnings. Strangely, subsequent research has largely ignored their findings and not examined the long-term effects of high school effort.

More recent studies have shown that effort affects students’ grades and test scores in junior high and early high school. Shouse, Schneider, and Plank (1992) found that grades were related to completion of homework and inattentiveness in class among eighth graders. Farkas et al. (1990) found that junior-high grades and test scores were affected by homework and other behaviors (see also Farkas 1996). Similar findings have been noted for these outcomes in early high school (Ainsworth-Darnell and Downey 1998; Roscigno and Ainsworth-Darnell 1999). These authors speculate that by affecting junior-high grades and test scores, students’ efforts thereby affect later educational attainments, but they do not study later educational attainment or consider whether effort has effects independent of test scores.

Effort has also been the focus in other studies. One study examined students’ attitudes about efforts (“how satisfying . . . to work hard on studies”) (McDill, Meyers, and Rigsby 1967). Other work has examined the influence of SES, school, and peer factors on homework time and the influence of homework time on students’ grades

(Keith 1982; Natriello and McDill 1986). Another study showed that effort in college is related to college grades at a large state university (Rau and Durand 2000). One major study showed engagement effects on tenth-grade test scores, but it did not show the separate effects of effort (Smerdon 1999). Smerdon's concept of engagement includes homework time as two of its eight components, but it also included behaviors that indicate rule violations (skipping class, late to class, absences). Similarly, Sander (2000) employed an instrument for Catholic school attendance and found that minority students had higher math and vocabulary test scores in Catholic schools, in part because of the higher levels of homework these students did in this school sector; however, the finding did not apply to white students. These studies indicate that school effort is important for achievement, but they have not examined whether effort might have enduring effects on later attainment, independent of achievement, or whether the influence of effort might vary by SES background.

This study focuses on one dimension of effort which we believe captures its most important dimension: time spent on homework outside of school (Keith 1982). The time spent on homework is a report of actual behavior, and this behavior indicates (and perhaps develops) one's capability for effort, which may contribute to academic skills. Effort may also affect later educational attainment, net of academic skills. Even if students with modest academic skills struggled through high school by exerting a great deal of effort, that effort may indicate a capacity for perseverance that will be useful when college presents difficulties. Even if students with strong academic skills coasted through high school without exerting effort, they may have problems if presented with difficult material in college.

This study examines the following questions: Are students correct in believing that a lack of effort in high school has no enduring influence on ultimate educational attainment? Is high school effort related to educational attainment in the long run, and are these relationships totally mediated by test scores? Is effort less related to outcomes for some SES groups? Are these relationships due to school-wide differences or do effort differences within schools lead to different outcomes?

These questions address basic features of the incentive structure of the American educational system, whether it offers payoffs to high school effort, or whether the benefits of these efforts largely vanish in later years. At a time when open admissions and other second-chance programs have become widespread and seek to reduce the impact of poor high school records, especially for low-SES students, there is particular interest in whether students' high school efforts have an impact on their ultimate educational attainment.

METHODS

DATA

This study uses the High School and Beyond (HSB) sophomore cohort data set from base year to fourth follow-up, which contains data collected from students starting in their sophomore year of high school in 1980, every two years until 1986, and then again in 1992. The original base year study selected students using a two-stage, stratified probability sample design with schools as the first stage unit (Frankel et al. 1981). For the sample, we selected only students who participated in the base

year and all four follow-up waves ($N = 14,825$). We weighted the sample accordingly, projecting to the national population of approximately 3,781,000 high school sophomores in 1980 and adjusting for the unequal probability of selection and nonresponse (Zahs et al. 1995).

A strength of this study is that it examines long-term outcomes — educational attainments at about age 28. Some studies have tried to assess educational attainment only 4-6 years after high school graduation, but many students take much longer than this to complete bachelor's degrees, and even two-year associate degrees can take more than six years, especially for students who combine part-time schooling with employment (Digest of Education Statistics 1998). As a result, we chose a dataset with a relatively long follow-up — 10 years after high school. Previous research has rarely had such long-term data.

VARIABLES

Dependent Variable

The dependent variable in the analyses is long-term educational attainment, approximately 10 years after high school graduation. This is a continuous measure of years of education recoded from the HSB composite construct, which was based on postsecondary transcript data for the highest degree attained by 1992. The values were: 11 = less than high school; 12 = high school diploma; 13 = some postsecondary education (PSE); 14 = associate's degree; 16 = bachelor's degree; 18 = master's degree; 20 = professional/doctoral degree. Students who graduated from high school but did not report a post-secondary institution were coded as having attained a high school diploma.

Independent Variables

Effort is hard to measure. We selected time spent on homework outside of school, which has the virtue of referring to actual behavior and is a better measure of individual effort than time spent on homework inside of school during study periods (Keith 1982). This measure is subject to perceptual distortion but not to the subjective biases of scales that depend on how individuals interpret “much,” “too much,” or “feeling pressured.” Students may distort their reports of homework time to their peers, but they lack such motives on this written survey, which no one in their school will see. Homework time is a categorical variable representing hours of homework done per week outside of class, in twelfth grade, which we recoded to the midpoint values for the purpose of regression analyses (none = 0; < 1 hour = .5; 1-3 hrs. = 2; 3-5 hrs. = 4; 5-10 hrs. = 7.5; 10-15 hrs. = 12; 15 or more hrs. = 18).

Other independent variables included both individual and school level attributes. Our individual variables included three scales constructed in the HSB data files — *socioeconomic status* (the non-missing average of mother and father's education, occupation, and family income and possessions), *achievement* test score (the non-missing average of the first follow-up reading, vocabulary, and math scores), and *grades* (cumulative high school GPA 1 = Mostly D's, 60-64; 2 = Half C/D, 65-69; 3 = Mostly C's, 70-74; 4 = Half B/c, 75-79; 5 = Mostly B's, 80-84; 6 = Half A/B, 85-89; 7 = Mostly A's, 90-100). We also included dummy indicators for *female* (male as reference

group), *black and Latino*(with white and Asian as reference), curriculum *track* (college preparatory track, with general and vocational tracks as reference). School level variables included dummy indicators for *school type* (private and Catholic, with public as reference) and *region* (South, Northeast, and West, with Midwest as reference).

ANALYTIC APPROACH

We take seriously the emphasis on process in the status-attainment model. Rather than conceive of social class as a barrier, which reduces attainment, we examine whether SES is related to effort, whether effort is related to educational attainment, net of SES, and whether this relationship varies by SES. In sum, our analyses will examine three sets of questions. First, after controlling for social background and school structures, do students' efforts have a significant relationship to their educational attainment? Second, do efforts have lesser payoffs for low-SES students than for others? Third, do these relationships occur within schools? We shall examine these questions first without controlling for test scores, and then with such controls. The analyses without controls for achievement tests show upper-bound effects of effort. The second analyses including test scores show the effects of effort, independent of achievement, and therefore a lower-bound effect because effort surely has effects on achievement (as prior research and our analyses show).

To test these questions, we use both multivariate linear regression and fixed effects regression analyses including only those cases for which we have data on SES, test scores, and homework time to give comparable samples across all models ($N=6,234$).¹ The means and standard deviations of the variables for the final sample are shown in Table 1. We begin the analyses below with simple models which show the relationship between homework time and test scores and go on to show the degree to which high school effort is associated with long-term educational attainments at age 28 after controls for social background and school influences. Then, we examine how much of the influence of effort is mediated by test scores, and how much of effort's influence is independent of test scores.

TABLE 1
DATA DESCRIPTIVES FOR THE ENTIRE SAMPLE*

	Mean	SD
12th Grade homework time	5.11	4.45
Composite test score	52.75	8.81
SES	.02	.76
Black	.13	.34
Hispanic	.22	.41
Female	.52	.50
South	.30	.46
West	.19	.39
Northeast	.24	.43
Private school	.27	.45
College track	.41	.49
Grades	4.43	1.31
N	6234	

* This includes only those students for which we have data for test scores and homework. Data are weighted by fourth follow-up panel weight.

RESULTS

DETERMINANTS OF HOMEWORK TIME AND TEST SCORES

As in previous studies, we find that higher socioeconomic status, female, black, Latino, college-track, and private-school students did more homework on average, while living in the southern region of the United States was associated with lower homework time (Table 2, Model 1). These results confirm the social class influence suggested by Willis (1977). Although our findings contradict Fordham and Ogbu's (1986) assertions about blacks, Bauman (1996) raised doubts about that finding, and Ludwig and Cook (1997) reported that the typical black or white student spent similarly low amounts of time on homework per week (less than 2 hours).²

TABLE 2

REGRESSION ANALYSES FOR THE PREDICTION OF HOMEWORK TIME AND TEST SCORES

	Model 1 Homework Time	Model 2 Test Score	Model 3 Test Score
SES	.889** (.075)	3.150** (.132)	2.874** (.131)
Black	.954** (.162)	-4.022** (.285)	-4.319** (.281)
Latino	.545** (.136)	-3.628** (.239)	-3.798** (.235)
Female	1.202** (.103)	-1.482** (.181)	-1.855** (.180)
south	-.460** (.139)	-1.198** (.244)	-1.055** (.241)
West	.288 (.158)	-.304 (.277)	-.394 (.273)
Northeast	.068 (.145)	.518 (.254)	.496* (.250)
Private school	.759** (.122)	.188 (.214)	-.048 (.211)
College track	1.484** (.110)	4.746** (.193)	4.284** (.193)
Homework time			.311** (.021)
Constant	3.467** (.125)	53.079** (.220)	52.001** (.229)
F	83.13**	305.00**	304.96**
R ² (adj)%	9.9	28.9	31.1
N	6737	6737	6737

NOTE Unstandardized coefficients are presented. Data are weighted to represent all U.S. sophomores in 1980, from base year to fourth follow-up.

* $P < .05$, ** $p < .01$.

As in prior studies, we also find that high-SES and college-track students have higher test scores, while females, blacks, and Latinos have lower test scores on average (Table 2, Model 2). Students in the South have lower test scores, while private schools have no significant influence with the addition of these control variables. After all of the demographic and school controls, homework time strongly and significantly predicts tested achievement (Model 3). In a separate analysis, we also controlled for

homework time at 10th grade in addition to 12th grade to predict test scores at 12th grade. The results were virtually the same and are not shown here. These results are consistent with prior research on younger students (Shouse, Schneider, and Plank 1988; Farkas et al. 1990).

Our findings replicate previous work and support the conclusions of prior researchers about the plausibility of effort's influence on achievement, although we must admit, as they do, that causality may go in both directions.

DETERMINANTS OF EDUCATIONAL ATTAINMENT

We next examine how high school effort predicts educational attainment 10 years later. As shown in the literature, SES, race, and curriculum track contribute substantially to educational outcomes. Blacks and Latinos have significantly lower educational attainment (Table 3, Model 1). Enrollment in a college track increases educational attainment by over three-quarters of a year ($b = .795$). Students in western and southern states have lower years of education, but living in the Northeast has no effect (relative to the Midwest). Even after controlling for these demographic factors and school characteristics, homework time is still significantly related to later attainment. Each additional hour of homework a student does per week is associated with an increase in educational attainment of about 8 percent of a year.

After adding test scores, the effects of many factors are changed (Table 3, Model 2). Females, blacks, and Latinos have higher educational attainment on average, compared to white males, while the college track and SES coefficients are reduced substantially. Homework time retains a significant influence, although reduced ($b = .055$ vs. $b = .077$). These results indicate that students' efforts are strongly and significantly related to their eventual educational attainment, independent of their achievement scores.³

One might think that grades provide a further control for achievement. Indeed, when grades are added to the above regressions, they do reduce the effects of effort, but effort remains significant (Table 3, Model 3). However, this model is misleading. Many teachers report that they assign better grades to students who show more effort. A quantitative analysis of school records found that teachers' ratings of students' "industry" were the strongest predictors of the grades they assigned to students, even stronger than test scores (Rosenbaum 1976). Therefore, while grades seem to "mediate" the effects of effort, they are doing so in part because grades are themselves measures of effort. Consequently, we will not include grades in subsequent analyses.

In terms of the research questions, our findings support the hypothesis that effort matters. High school effort strongly and significantly predicts later educational attainment, independent of its influence on academic achievement. This long-term enduring relationship in a national sample clearly indicates that high school efforts are associated with an important life-course outcome, even after controls for social background and test scores.

INTERACTION EFFECTS

Do low-SES students receive less benefit in educational attainment for their efforts? To test this, we divided SES into quartiles and constructed interaction terms

of homework time x SES quartile, using the highest and lowest quartiles in the model, with the middle two SES quartiles omitted (and thus reflected in the constant).

TABLE 3

REGRESSION ANALYSES FOR THE PREDICTION OF EDUCATIONAL ATTAINMENT (IN YEARS)

	Model 1	Beta	Model 2	Beta	Model 3	Beta
SES	.706** (.032)	.278	.488** (.031)	.192	.516** (.030)	.284
Black	-.327** (.068)	-.057	.008 (.065)	.001	.108 (.062)	.019
Latino	-.124* (.057)	-.026	.161*** (.054)	.034	.232** (.052)	.050
Female	.056 (.043)	.015	.208** (.041)	.054	-.005 (.041)	-.001
South	-.147* (.057)	-.035	-.061 (.054)	-.015	-.132* (.052)	-.031
West	-.583** (.065)	-.117	-.548** (.062)	-.110	-.663** (.060)	
Northeast	-.068 (.060)	-.015	-.103 (.057)	-.023	.028 (.055)	.006
Private school	-.014 (.050)	-.003	.004 (.047)	.001	.133** (.046)	.031
College track	.795** (.046)	.206	.460** (.045)	.119	.376** (.043)	.097
Homework time	.077** (.005)	.179	.055** (.005)	.128	.038** (.005)	.088
Test			.078** (.003)	.354	.047** (.003)	.284
Grades					.418** (.019)	.212
Constant	13,299** (.055)		9,216** (.153)		9,210** (.147)	
F	192.77**		270.563**		309.92**	
R² (adj) %	23.5		32.2		37.3	
N	6234		6234		6234	

NOTE: Unstandardized coefficients are presented. Data are weighted to represent all U.S. sophomores in 1980, from base year to fourth follow-up.

* $P < .05$, ** $p < .01$.

Prior to adding test scores (Table 4, Model 1), SES, race, and track have substantial relationships to educational outcomes. The lowest quartile has almost a full year lower attainment than the top quartile SES. Several high-SES interaction variables are significant, indicating that women and college-track students receive an additional benefit for having high-SES background and that students in the West get less SES benefit. However, the high-SES group has the same payoff for effort as the middle-SES group. In contrast, only one low-SES interaction variable is significant: low-SES students got significantly lower benefit for increases in homework time (about 30-percent lower, $\beta = .069$ vs. $.098$) compared to the middle two quartiles. Increasing homework time by an hour a day (5 hours/week, just over a one standard deviation difference) raises the educational attainment of most students by about half a year (.49), but for low SES students, the same effort increase *only* leads to an increase of just over one third of a year (.345).

TABLE 4

**REGRESSION ANALYSES FOR THE PREDICTION OF EDUCATIONAL
ATTAINMENT (IN YEARS) WITH INTERACTIONS BY HIGH AND LOW SES**

	Model 1	Model 2
LOWSESQ	-.390*** (-.137)	.580 (.345)
HISESQ	.804** (.125)	-1.205*** (.361)
Black	-.483** (.089)	-.152 (.085)
Latino	-.323** (.079)	.001 (.075)
Female	-.026 (.060)	.108 (.056)
South	-.153" (.080)	-.036 (.075)
West	-.341** (.091)	-.371** (.085)
Northeast	-.126 (.081)	-.180" (.076)
Private school	.028 (.070)	.030 (.065)
Collegetrack	.762** (.064)	.442** (.061)
Homework time	.098** (.007)	.071** (.007)
Test		.076** (.004)
LOWSES x Black	.253 (.147)	.268 (.141)
LOWSES x Latino	.173 (.124)	.168 (.120)
LOWSES x Female	-.098 (.103)	-.081 (.097)
LOWSES x South	.154 (.141)	.112 (.132)
LOWSES x West	.092 (.168)	.203 (.157)
LOWSES x Northeast	.057 (.148)	.179 (.138)
LOWSES x Private school	.255 (.140)	.168 (.131)
LOWSES x Collegetrack	-.128 (.115)	-.104 (.111)
LOWSES x Homework time	-.029* (.013)	-.022 (.012)
LOWSES x Test		-.018** (.006)
HISES x Black	.019 (.185)	.109 (.174)
HISES x Latino	.212 (.144)	.069 (.135)
HISES x Female	.224* (.099)	.274** (.093)
HISES x South	-.101 (.132)	-.212 (.123)
HISES x West	-.580** (.143)	-.500 (.133)
HISES x Northeast	.121 (.136)	.013 (.127)

TABLE 4 (Continued)

	Model 1	Model 2
HISES × Private school	-.035 (.107)	-.002 (.100)
HISES × College track	.228* (.103)	.037 (.100)
HISES × Homework time	-.107 (.011)	-.024* (.010)
HISES × Test		.035** (.006)
Constant	13.148** (.073)	9.203** (.204)
F^2	71.640**	105.834**
R^2 (adj)%	23.3	33.2
N	6234	6234

NOTE: Unstandardized coefficients are presented. Data are weighted to represent all U.S. sophomores in 1980, from base year to fourth follow-up.

* $p < .05$, ** $p < .01$.

When test scores are added (Table 4, Model 2), the low-SES × homework interaction remains negative, but it drops just below the level required for significance. Low-SES students get significantly lower payoff for raising their test scores, but their payoffs for effort are lower, though not quite Significant. In contrast, after controlling for test scores, high-SES students get more payoff for their test scores, but significantly less payoffs for their efforts. For such advantaged students, those who must expend additional effort to achieve actually fare somewhat worse in their ultimate educational attainment. Note that effort has a strong significant effect in both models.

These results are most clearly seen by graphing them. Figure 1 shows the predicted values for educational attainment for each of the three groups, holding all the other study variables constant except homework. The estimates are shown for zero hours of homework, the average hours of homework per week (5 hours), one standard deviation above average (9.5 hours per week), and two standard deviations above average (13 hours per week). These results show three different patterns: The pattern for the top SES quartile has a high intercept and a strong positive slope; the pattern for the middle SES quartiles has a lower intercept and a very similar slope; and the lowest SES quartile students have a lower intercept and a much smaller increase in educational attainment for increases in effort. The SES gap in attainment increases with increased levels of effort.

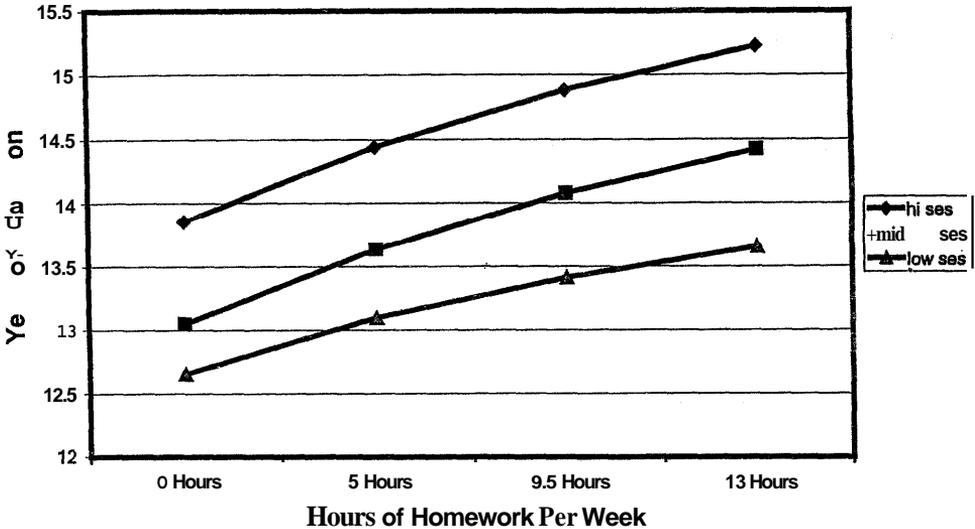
FIXED EFFECTS EXAMINING EFFECTS WITHIN HIGH SCHOOLS

While these results indicate effects at the individual level, students are in different high schools, and we might wonder whether the homework effect reflects school-wide differences in homework demands and educational attainments, rather than individual differences (Ludwig and Cook 1998). Fixed-effects models, which analyze influences of individual's deviation from his/her school-mean on each variable,

allow us to examine whether individual differences in measured attributes within schools are related to differences in outcomes (Miller 1998).

FIGURE 1

EDUCATIONAL ATTAINMENT BY HOMEWORK FOR THREE SES GROUPS



Fixed-effects are comparable to hierarchical linear modeling (HLM) analysis, and each has certain advantages. HLM has the advantage of producing estimates for the effects of various attributes at the aggregate level (e.g., school size, resources, standards), while fixed-effects models do not produce such estimates. Fixed-effects models compare students relative to others in the same school, so any link between individual effort (the individual's deviation from the school mean) and success cannot be attributed to school characteristics.

Some researchers prefer fixed-effects analyses for dealing with unmeasured biasing characteristics of schools, because they do not depend upon assuming that the research has controlled for all relevant school attributes. In HLM, the omission of an important school attribute may bias the other estimates in the model. Fixed-effects analyses avoid such biases and make fewer assumptions, so it has been used in some comparable research to remove school effects (Miller 1998). Fixed-effects is an appropriate choice because the concern of this research is not to examine which school attributes have effects but only to remove school effects so we can examine individual-level effects.

The above models were run as fixed-effects regressions with school identification code as the indexing variable. Variables that are constant for a high school (such as region and private school) fall out of the analysis. The fixed-effects analysis of the simple model finds that the homework effects are similar, but somewhat smaller (Table 5).

TABLE 5

**FIXED EFFECTS REGRESSION ANALYSES FOR THE PREDICTION OF EDUCATIONAL
ATTAINMENT (IN YEARS) WITH INTERACTIONS BY HIGH AND LOW SES**

	Model 1	Model 2
LOWSESQ	-.110 (.082)	1.054 (.265)
HISESQ	.300** (.079)	-1.053** (.284)
Black	-.367** (.072)	-.171* (.071)
Latino	-.158* (.062)	.000 (.062)
Female	.012 (.047)	.088 (.046)
College track	.336** (.049)	.176** (.049)
Homework time	.049** (.006)	.040** (.006)
Test		.044** (.003)
LOWSES x Black	.299** (.110)	.195 (.110)
LOWSES x Latino	.114 (.093)	.044 (.094)
LOWSES x Female	-.032 (.080)	-.078 (.078)
LOWSES x College track	-.132 (.086)	-.033 (.088)
LOWSES x Homework time	-.015* (.010)	.010 (.010)
LOWSES x Test		-.022** (.005)
HISES x Black	.072 (.141)	.114 (.139)
HISES x Latino	-.119 (.110)	-.115 (.108)
HISES x Female	.050 (.076)	.047 (.074)
HISES x College track	.150* (.078)	.057 (.079)
HISES x Homework time	.008 (.008)	.001 (.008)
HISES x Test		.024** (.005)
Constant	13.413** (.046)	11.127** (.167)
F	39.24**	57.72**
R^2 (adj)	.21.8	.31.3
N	6234	6234
Number of Schools	962	962

NOTE: Unstandardized coefficients are presented. Data are weighted to represent all U.S. sophomores in 1980, from base year to fourth follow-up. School ID was used as the fixed effects index.

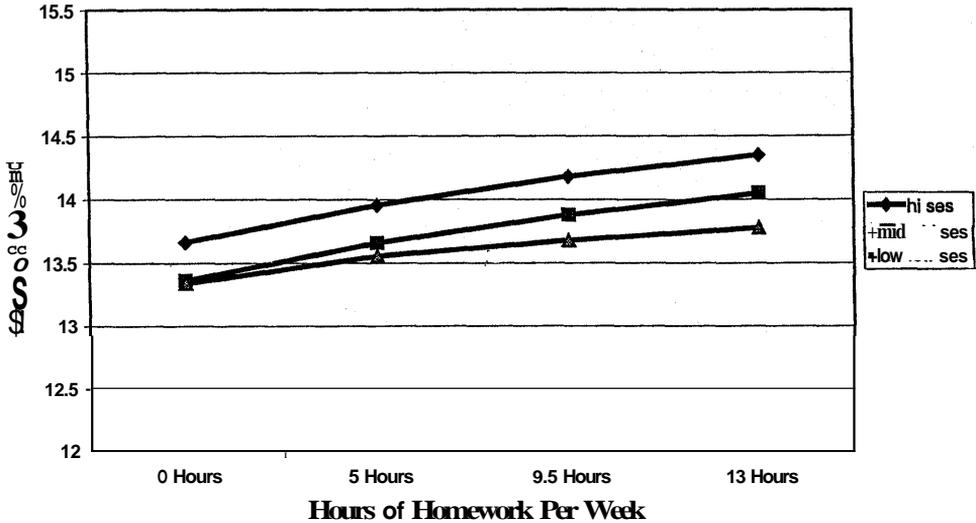
* $p < .05$, ** $p < .01$.

As can be seen in Figure 2, even after adjusting for school averages, low-SES students still get less payoff for their efforts, while there are no significant differences

for the high-SES group after adjusting for fixed effects. Controlling for test scores again mediates the negative coefficient for low-SES students' homework.

FIGURE 2

EDUCATIONAL ATTAINMENT BY HOMEWORK TIME FOR THREE SES GROUPS (AFTER SCHOOL FIXED EFFECTS)



DISCUSSION

This paper has shown that high school effort, as measured by the amount of time students reported spending on homework outside of school, has a strong and significant relationship with educational attainment 10 years later. Although part of the relationship was mediated by achievement (as measured by tests and grades), effort is still strongly and significantly related to later educational attainment, independent of achievement. Even though teachers' grades are partly based on students' effort, their effort is still related to later attainments, independent of grades. While these analyses do not identify the mechanism, they indicate that the relationship between effort and later attainment is not entirely mediated by race, gender, region, private school, curriculum track, achievement, or grades, and the relationship remains within high schools, so they cannot be attributed to school differences in homework demands.

Thus, while some researchers have gloomily predicted an IQ meritocracy which dooms people at birth to their future station in life by determining their educational achievement and attainment (Herrnstein and Murray 1994), our results suggest that achievement and educational attainment can be partly explained by effort. Unless effort is totally determined by genes (which even Herrnstein and Murray do not assert), our findings suggest that students' high school efforts are significantly related to later educational attainment, after controls for academic achievement and even

within high schools. Even if we pretend that test scores are totally genetic (an overgenerous assumption given our findings on their relationship to effort), effort remains a strong, significant predictor of later educational attainment, independent of test scores. The notion that effort is a key to success may be an exaggeration, but it is a reasonably good explanation of the outcomes we have observed. Those who exert the most effort in high school have significantly higher educational attainment at age 28 than those who do little homework.

Besides confirming the usual findings that SES is strongly related to educational attainments, we also discover that social processes are less responsive to the efforts of low-SES students. Low-SES students begin with lower prospects, and their efforts are less strongly related to their later educational attainment. While low-SES students on average exert less effort, some do exert more effort, but the ones who exert more effort get less payoff for their effort. As Figure 1 indicates, low-SES students who do 13 hours of homework a week have lower attainment than high-SES students who do no homework. If they were aware of such processes, they might infer that they had little incentive for exerting effort in high school. While effort may not be genetically determined, it may be affected by the poor incentive structure.

CONCLUSION

The High School and Beyond dataset used here was a strong one, with a national sample and long-term follow-up, yet there is great need for further research on these questions. The amount of time spent on homework may be caused by many factors in the individual (motivation), in the individuals' social environment (distractions), or in the ways individuals construct and interpret their environment (peer choice, beliefs about incentives). Our data are not suited to sorting out these factors, and that task must be left to others with more appropriate data.

Some may be concerned about the causal ordering in our model, which follows the example of prior research. Do efforts affect test scores or vice versa? While it is *possible* that some causation goes in the opposite direction than we assume — that achievement may affect students' efforts — it is *certain* that some causation goes in the direction we and prior research assume — that low effort reduces test scores. Homework efforts improve achievement, and, moreover, the act of test-taking requires effort, sustained attention, persistence, **and** tolerance of frustration on test questions that have no payoff. If tests actually measure the noncognitive capabilities developed by doing homework, it is not surprising that test scores mediate *so* much of the influence of effort. Regardless of how these relationships are interpreted, we find that effort strongly predicts long-term outcomes, independent of test scores. A different causal ordering will not alter that finding.

Some critics may be concerned that students misperceive their efforts. That concern is worth exploring in future research, although objective measures of effort will be difficult to study for large samples. If true, it could conceivably explain our results. While we have no reason to believe this is the case, one might imagine that low-SES students might report **an** hour of work when they actually did less. However, even if students misperceive their actual time on homework, the present results still have importance. They indicate that students who feel they spend the most time at homework have better outcomes, but this is less true for low-SES students. More

objective measures might alter these relationships, but students' perceptions are the most important consideration if one seeks to understand students' inferences about their incentives for effort. Low-SES students' perceived efforts are less related to educational outcomes than the perceived efforts of other students, and these relationships are likely to influence their perceptions of incentives. Prior research finds that many youth, especially low-SES youth, are skeptical about the value of school (Mickelson 1990; Steinberg 1997; Willis 1977). Even if one doubts the accuracy of students' perceptions, these findings indicate that there may be a rational basis for low-SES students being doubtful that their efforts will have a payoff. Policy efforts to persuade these students to exert effort in school must deal with these findings.

If the findings indicate an objective reality, we may speculate about the mechanism underlying the diminished benefits for low-SES students. Even beyond its effects on academic skills, homework time may also indicate noncognitive skills (e.g., a capacity for persistence) that are useful for coping with difficult challenges in college. The diminished benefit for low-SES students may arise because low-SES students live in radically different environments than other students — they have different families, peers, neighborhoods, types of colleges, labor markets. Any of these factors could reduce the effectiveness of students' efforts in getting through college. If homework time indicates a noncognitive personal attribute (like persistence), the payoff to this personal attribute may be diminished for low-SES students because of school factors — teacher or guidance counselor neglect, for example (see Cicourel and Kitsuse 1964; Rist 1970). Family and neighborhood effects such as the anxiety-provoking distractions of economic distress, family conflict, or gang violence (Wilson 1996) may also play a role. These effects could arise for low-SES students because their families, peers, neighbors, and urban community colleges offer fewer positive role models, fewer contacts for good jobs to support them through college, less information about college requirements, or fewer labor-market incentives. Some research indicates that low-SES students have fewer positive role models (Steinberg 1997), worse job contacts (Granovetter 1974), and poor information for making course choices and educational plans (Deil and Rosenbaum, 2001; Rosenbaum 2001), all factors that may increase the risk of dropout. Unfortunately, the survey data we used do not allow us to examine the influence of these or other mechanisms.

Thus, the source of the diminished benefits to effort may be inside students or in the environments that they face. While further research is needed to examine the causes of these results, our analyses have discovered the nature and magnitude of the problem.

Low-SES students not only have lower attainments but also obtain less payoff from their effort than others. In large part, these effects are mediated by test scores (not surprising if tests partly measure the noncognitive capacity to persist on irrelevant test items). They also get less payoff from their test scores than others. However, when low-SES students consider whether to exert effort on homework, they may not see much of an incentive. Given the diminished payoff and the overall low attainments of low-SES students who exert a great deal of effort, it would not be surprising if low-SES students inferred that school efforts have little payoff for them.

Interestingly, high-SES students receive significantly higher payoffs for their test scores but significantly lower payoffs for their efforts, after controlling for test scores. When socially advantaged students exert more effort than others to obtain the

same level of achievement, this may indicate that such students are “overachievers” and lack the ability required for college. Such counterproductive effort is not evident for other groups.

We have shown several models of the incentive structure. However, we do not know which model, if any, students view as their incentive structure. **Do** students look at their achievement benefits, attainment benefits, or attainment net of achievement?⁴ **Do** they look at projected outcomes (achievement or attainment), gains in outcomes, or outcomes relative to other students, and, if the latter, which students? We cannot answer those questions, but our models indicate the larger social context in which students are presented with incentives. Micro-level studies are needed to examine how students perceive their incentives. Regardless, all our models indicate payoffs to effort for most students, but low-SES students have lower attainments and less payoff.

Americans have a strong belief in second chances. We believe that it is never **too** late to start working hard, and we even have constructed second-chance institutions — open-admissions colleges — to foster these chances. Some youths have even gotten the idea that this means that high school efforts are unimportant, that it will not hurt their careers if they wait until college to start working hard (Rosenbaum 2001). It is possible that many people who loafed in high school can exert effort later in college. But if that happens, we find that such late efforts **do** not erase the persisting effects of high school efforts, even independent of test scores. While these results do not mean that increasing efforts in college is ineffective, they do indicate that exerting effort in high school tends to have long-term benefits. Unfortunately, these analyses do not indicate why. Clearly more research is needed on this question.

Jencks et al. (1972) called the unexplained variance in their model “luck.” While journalists made more of this term than Jencks did, our paper suggests a serious limitation of this inference. We can only infer “luck” if we assume that all students work equally hard. That assumption is wrong. Students vary in their effort, and we have shown that the variation in students’ homework time is a significant predictor of educational outcomes. Some people make their own “luck,” but lower social class background diminishes one’s capacity to do *so*.

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NOTES

1. Though not shown here, we ran all analyses with indicators for missing data on SES, test scores, homework time, and those students who reported “none assigned” for hours of homework per week. There

are no significant differences for students who report that they are not assigned homework, so we omitted those students from the analyses. Then we computed indicators for missing SES composite data, missing test composite data, and missing homework data. Those students, who are missing socioeconomic composite, test composite, and homework data all have significantly lower educational attainment on average. The majority of the students who are missing test composite data are also missing SES composite data (82 percent) and homework data (60 percent). Composite data on SES and test score are the average of the non-missing data on several indicators, so these composites are still more inclusive than individual items. Therefore, all analyses were done on a final sample with $N = 6,234$, after deleting cases missing data on SES, test score, and homework time. Although researchers often impute missing data with mean values to retain sample size, we chose to leave these cases out, since assigning mean values to missing data can bias parameter estimates (those missing data on test score, homework, and SES all have lower educational attainment on average). Our analyses provide a conservative test of our hypotheses by slightly underestimating the effects of SES and test score and significantly underestimating the effects of homework time and its interaction with SES.

2. In a bivariate relationship, black students report higher levels of homework, but Latino students report lower levels. After controlling for SES, the Latino coefficient becomes positive while the black coefficient becomes larger. Our findings differ from Mickelson's (1990), which may be due to the difference in samples.
3. We wondered if the process worked differently for gender and race subgroups. It is possible that certain groups have a tendency to over-report systematically the amount of work they are doing, thus raising the possibility that our measure of effort works differently for these groups. It is also possible that the social processes by which effort is channeled into achievement or attainment work differently for these groups (e.g. review by Ferguson 1998). Despite some concerns about possible differences in reporting accuracy or treatment of different gender or race groups, in race and gender subgroup analyses, we found significant relationships between effort and attainment for males and females and whites and blacks. Both females and blacks have a slightly lower return to effort in terms of educational attainment than males and whites. While we cannot assess whether different groups have different accuracy of reporting, the results indicate that high school effort is strongly and significantly related to later educational attainment for all groups (analyses available from the authors). We thought it might also be important to run the analyses separately for race \times gender subgroups, but after weighting and removing cases missing test scores, some of the resulting sample sizes were too small to be reliable.
4. In analyses adding SES \times test score interactions, we found that although low-SES students get lower payoff for their efforts in terms of educational attainment, they get the same returns for their efforts in terms of tested achievement (analyses available from authors).

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